

Preliminary work for statistical regionalization application

Proyect 9: Training in development and evaluation of statistical algorithms to obtain regionalized climate change scenarios.

Area of Climate Change Evaluation and Modelization

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Outline

1. Programming language learning

- 1.1 Unix

- 1.2 Fortran

- 1.3 R

2. Preliminar activities

- 2.1 Temperature gradient predictor

- 2.2 Relative humidity data handling

- 2.3 Maximum period of rainy days

- 2.4 Data sorting by Autonomous Regions

3. Future Work

1. Programming language learning

1.1 Unix

Programms	Commands and functions learned
A) Userinfo	<i>“echo”, “date” and “who”</i>
B) Greetings	<i>“read”</i>
C) Create file:	<i>“cd” , “mkfile” and “touch”</i>
D) Create directory	<i>“mkdir”, “awk” and loop “for-do”.</i>
E) Create file/directory	loop <i>“if”</i> and use of array

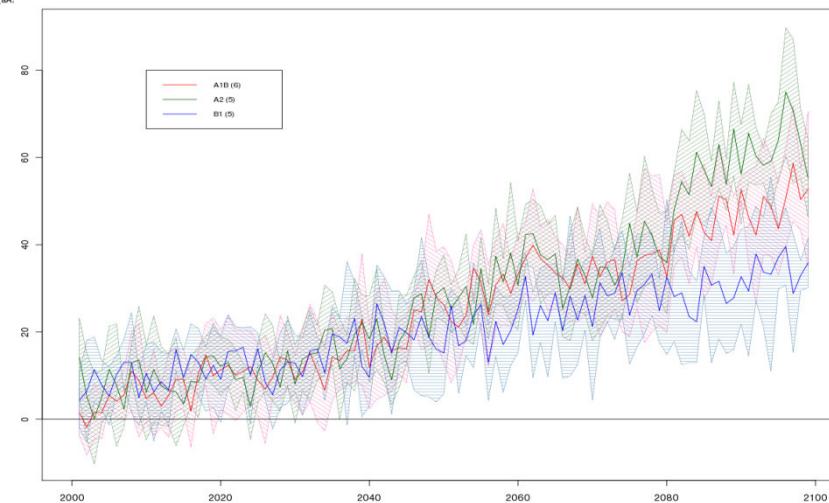
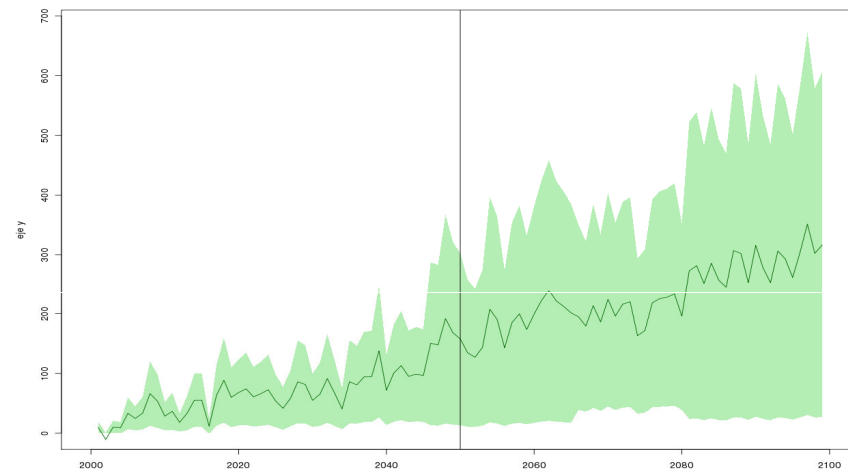
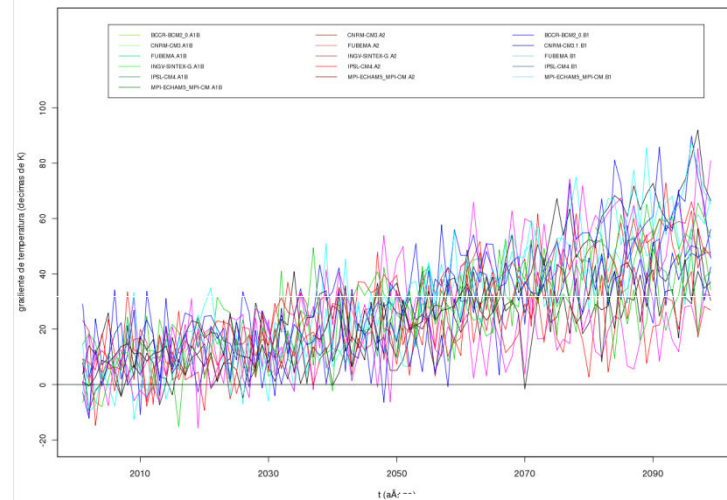
1.2 Fortran

Programms	Commands learned
A) Questions and answers	<i>“PRINT”, “READ”, for” loop , arrays and parameters</i>
B) Integer part	<i>“MOD” and “if” loop</i>
C) Split	<i>“Open”, “Close”, “read()”, “write()” and “format()”</i>
D) Median	<i>Allocatable arrays, “allocate” and the nested loops</i>
E) Linear equation system F) Non linear equations	user defined <i>functions</i> , <i>“subroutines”</i> and implementation of the <i>bisection method</i>
H) Percentile	<i>Modules</i>

1.3 R

Data: increase in temperature (°C). (2000-2099)

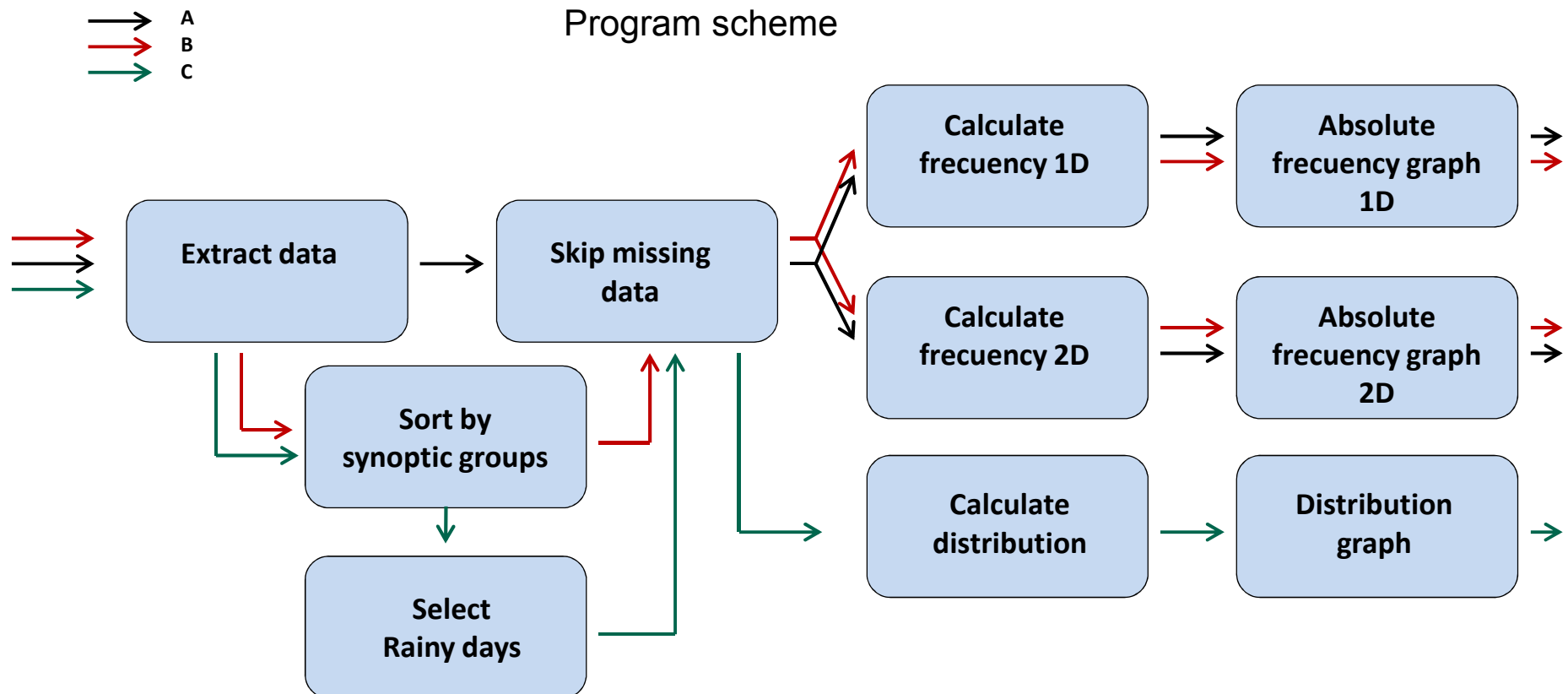
A1B	BCCR-BCM2_0, CNRM-CM3, FUBEMA, INGV-SINTEX-G, IPSL-CM4, MPI-ECHAM5_MPI-OM
A2	CNRM-CM3, FUBEMA, INGV-SINTEX-G, IPSL-CM4, MPI-ECHAM5_MPI-OM
B1	CNRM-CM3.1, FUBEMA, IPSL-CM4, MPI-ECHAM5_MPI-OM



2. Preliminar Activities

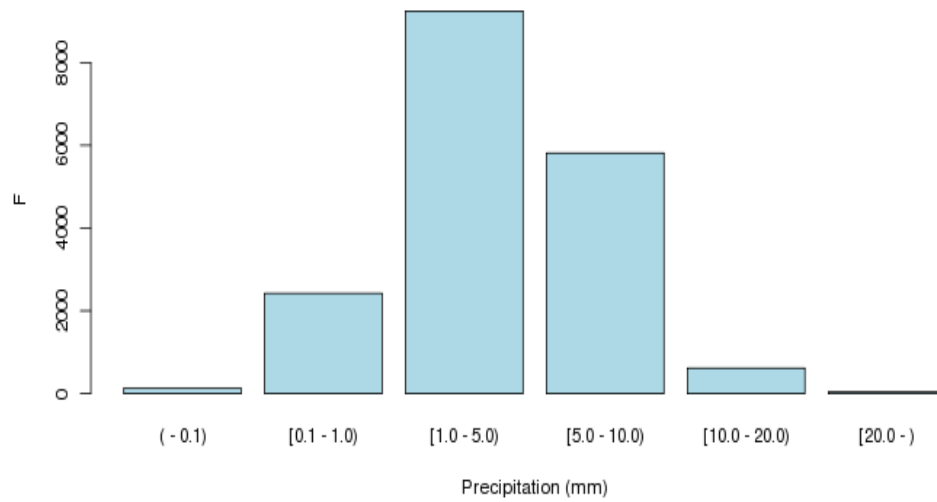
2.1 Temperature gradient predictor (R)

Objective	¿Is ΔT a good predictor for precipitation?
Data	T850 hPa, T500 hPa and p(dmm) for La Coruña (1387), Madrid-Retiro (3195), Sevilla (5783) and Valencia (8416) stations
Time range	From 01/01/1951 to 31/12/2005 (time step of 1 day)
Special values	-999 (no record) and -3.0 (p amount so weak to be measured)

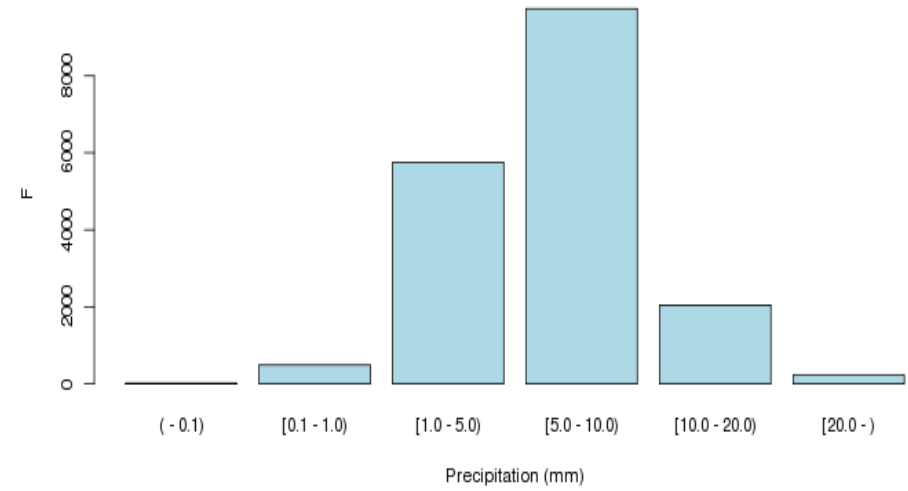


A) ΔT and p intervals

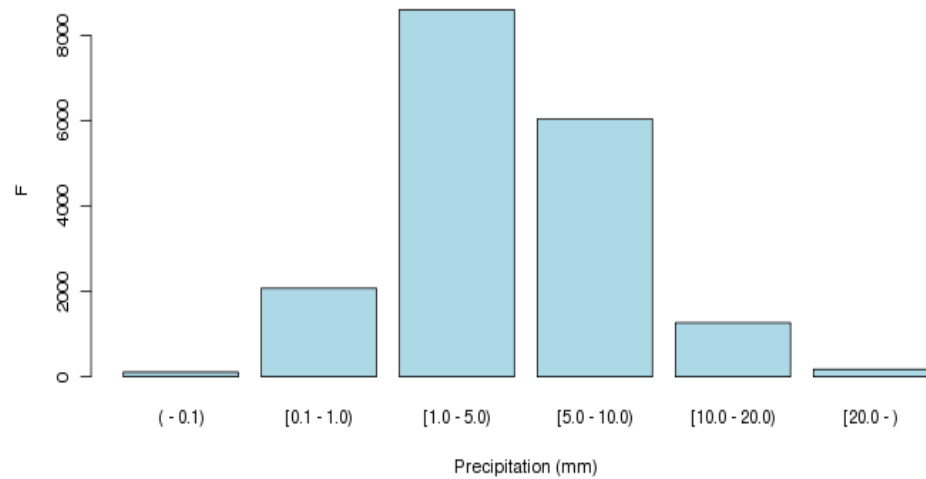
**Absolute Frequency for Precipitation Intervals
(Galicia)**



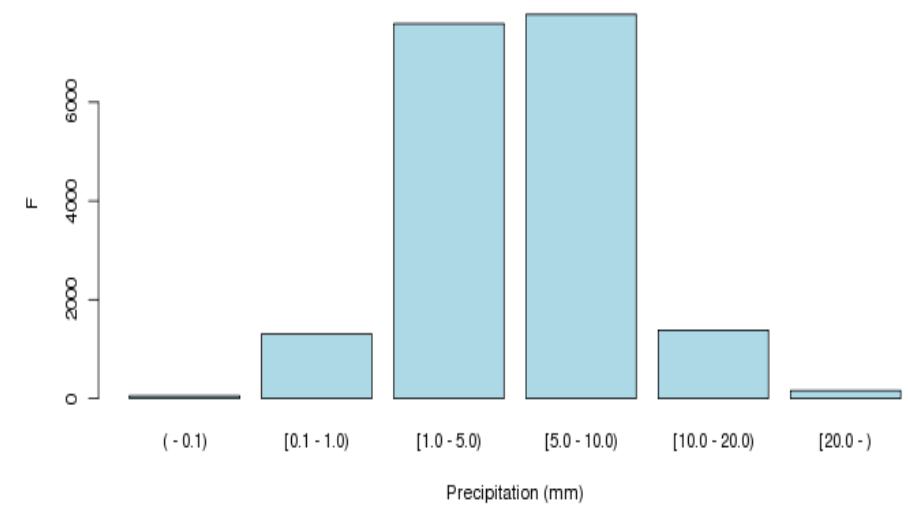
**Absolute Frequency for Precipitation Intervals
(Madrid-Retiro)**

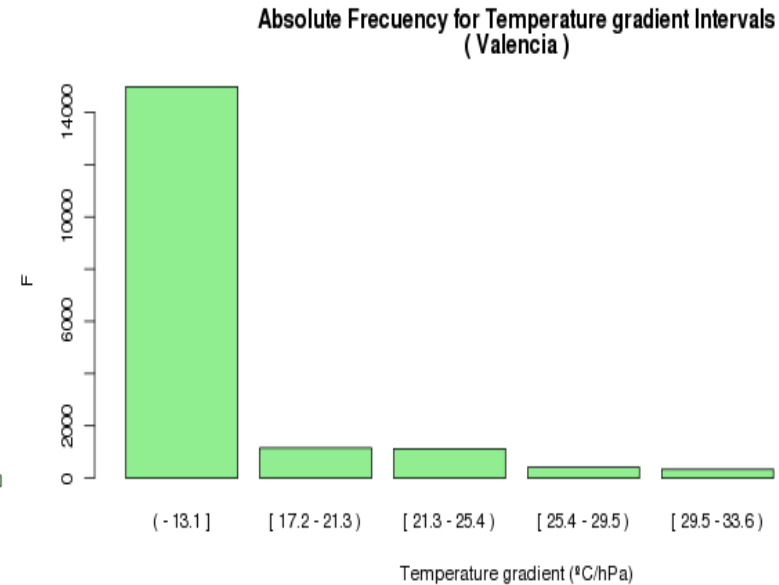
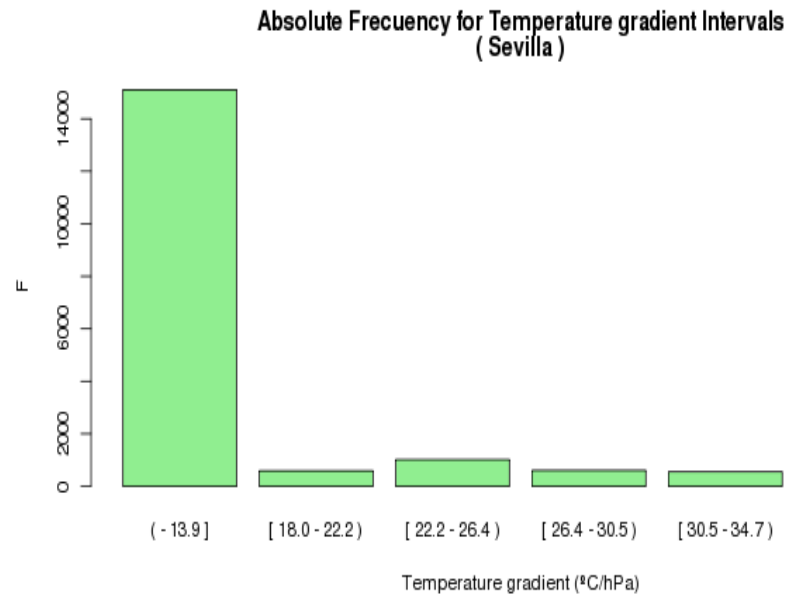
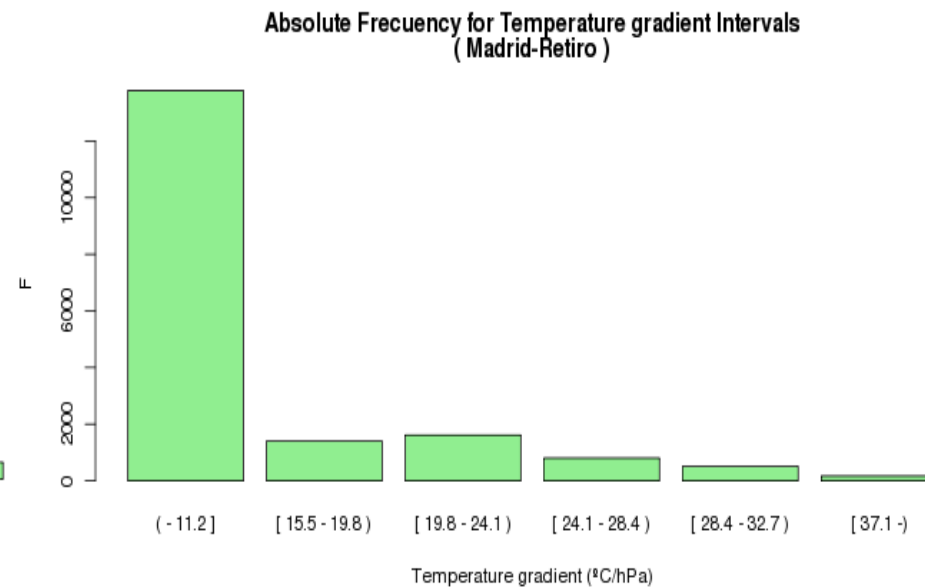
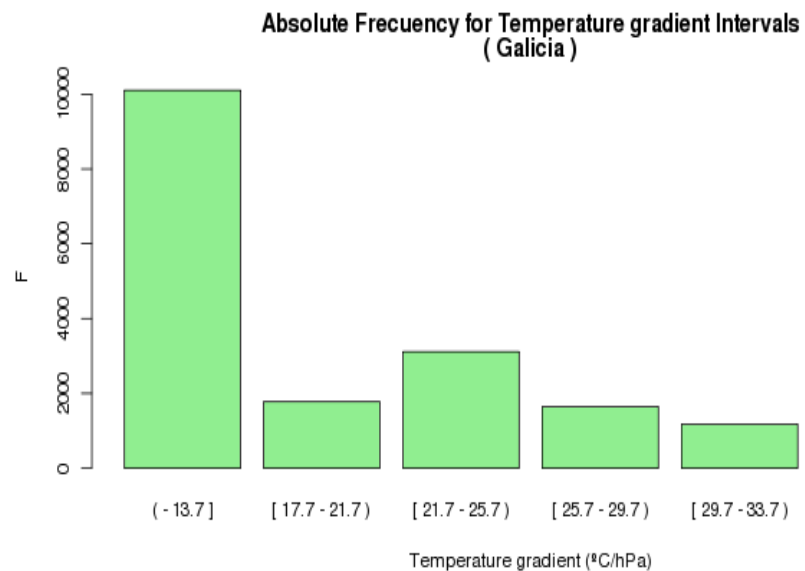


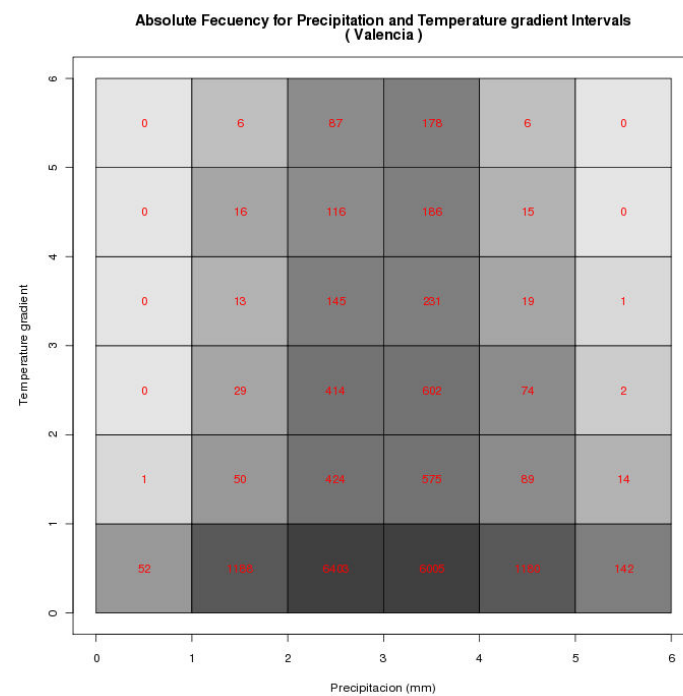
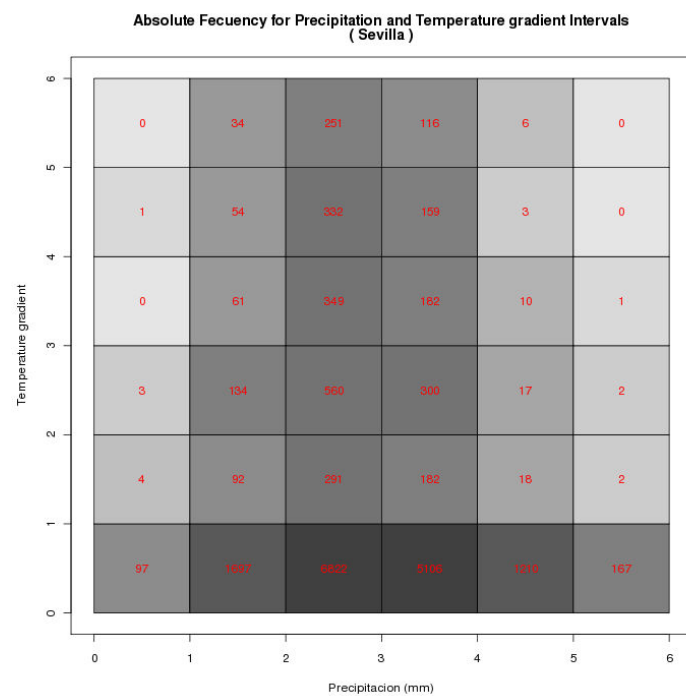
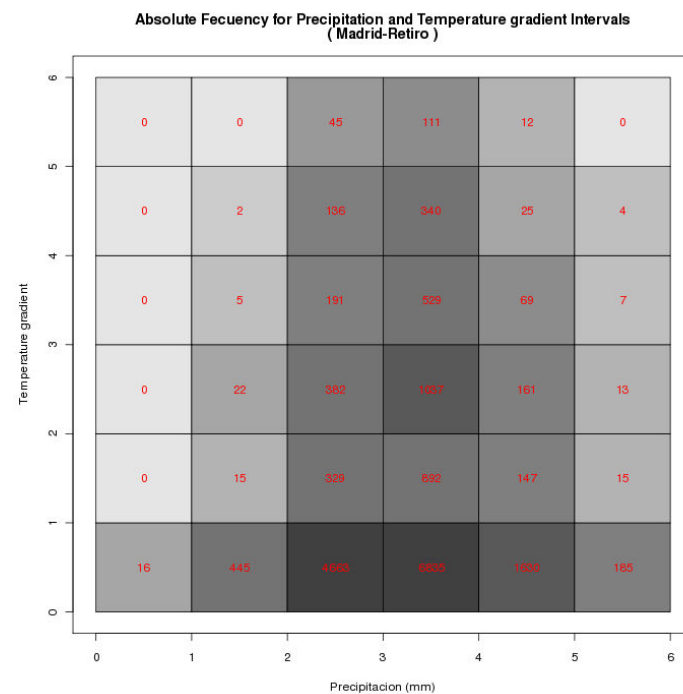
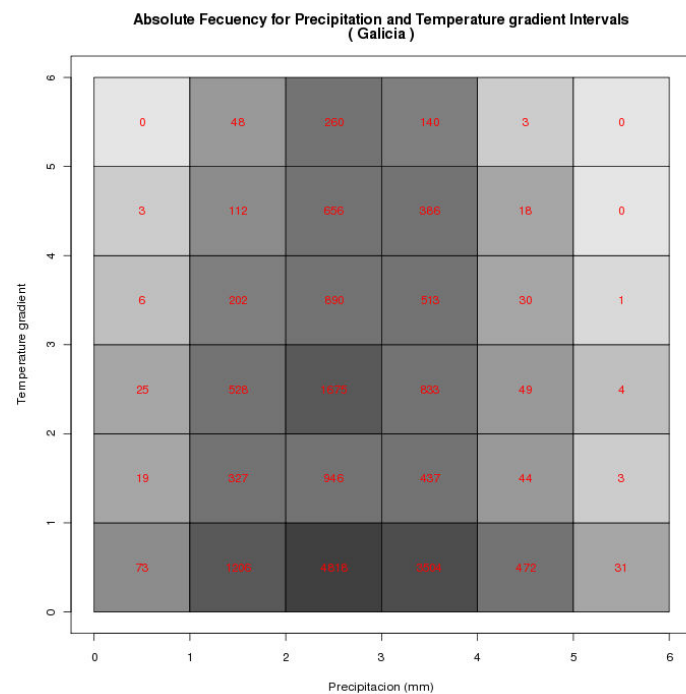
**Absolute Frequency for Precipitation Intervals
(Sevilla)**



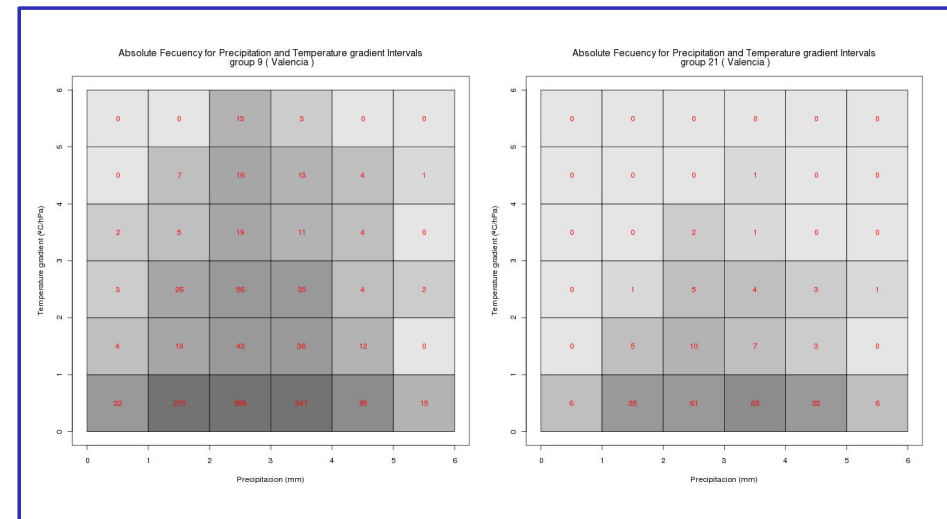
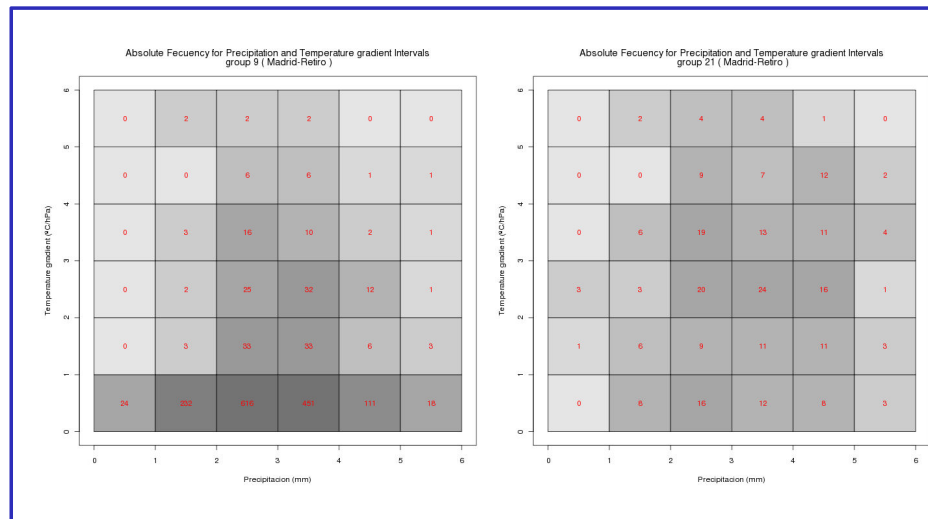
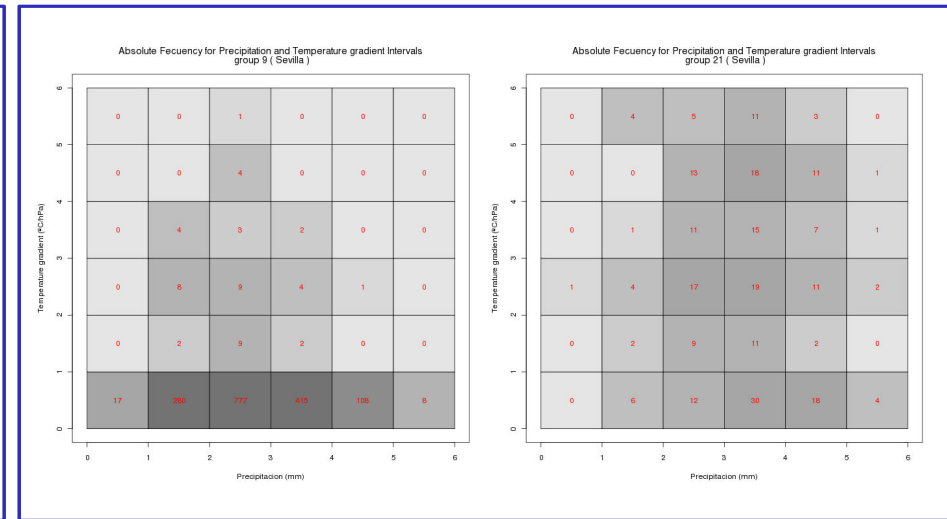
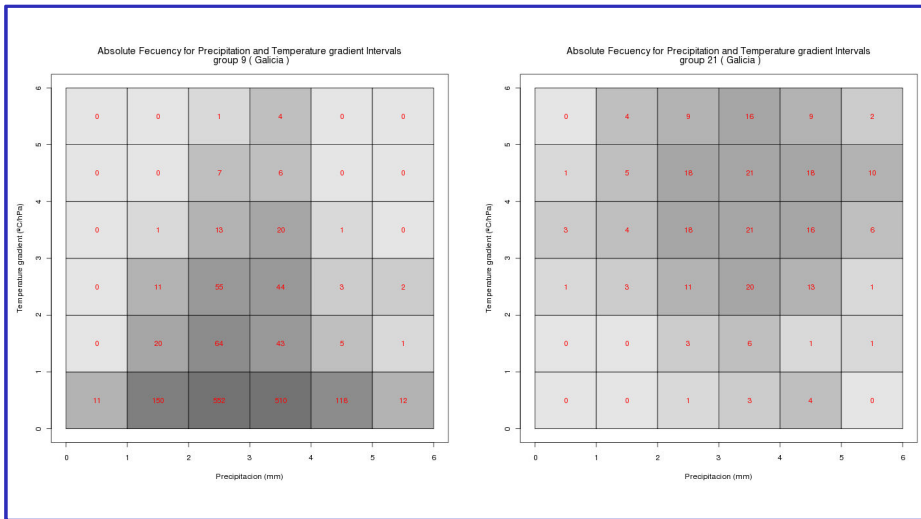
**Absolute Frequency for Precipitation Intervals
(Valencia)**



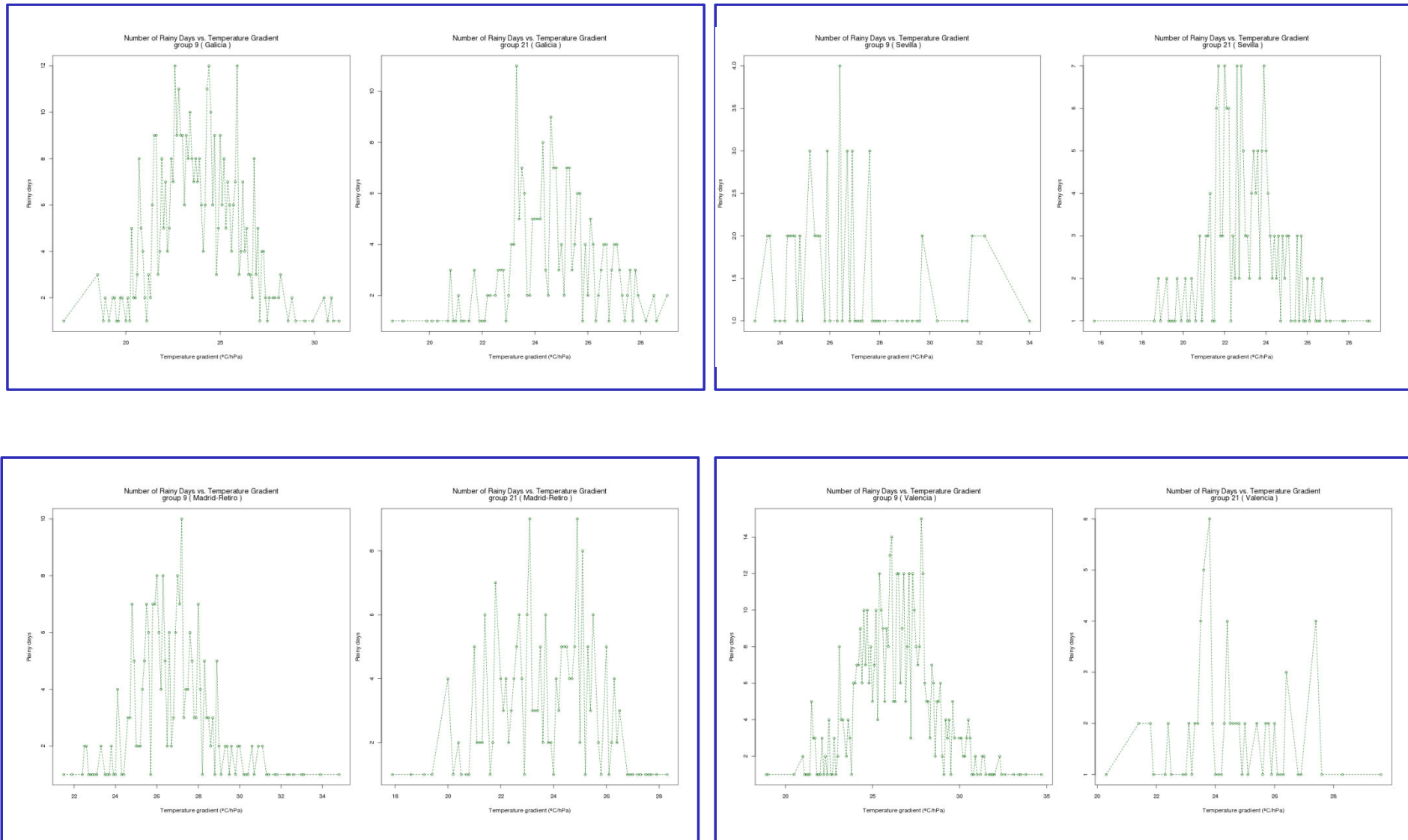




B) ΔT and p intervals for different synoptic groups



C) Number of rainy days for each ΔT value for different sinoptic groups



2.2 Relative humidity data handling

Programming language: Unix and Fortran

Objective: learn to read .nc files and call fortran programs from an unix script.

Data: mean daily relative humidity data at 850 and 1000 hPa in a 24 node grid (42.5N to 35.0 N and 7.5 W to -5.0 E). Time range 01/01/1951 to 31/12/2005.

2.3 Maximum dry period

Programming language: Unix and Fortran

Objective: calculate the maximum dry period for different models, periods and scenarios.

Data: daily data of prec for all observatories in Spain

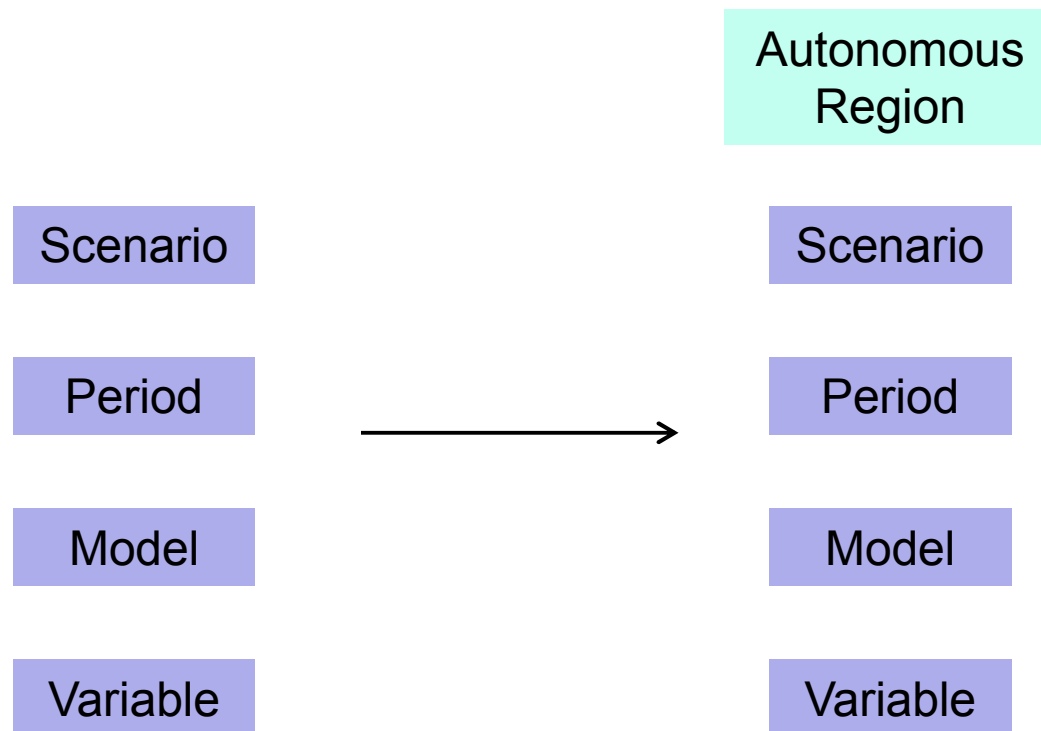
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giss_model_e_r	20c3m	m_sresa1b	m_sresa2	m_sresb1
inmcm3_0	20c3m	m_sresa1b	m_sresa2	m_sresb1
miub_echo_g	20c3m	m_sresa1b	m_sresa2	m_sresb1 (2046-65)
mri_cgcm2_3_2a	20c3m	m_sresa1b	m_sresa2	m_sresb1
mpi_echam5	20c3m	m_sresa1b	m_sresa2	m_sresb1
cccma_cgcm3_1	20c3m	m_sresa1b	m_sresa2	m_sresb1 (2081-00)
cccma_cgcm3_1_t63	20c3m	m_sresa1b		m_sresb1
gfdl_cm2_1	20c3m	m_sresa1b	m_sresa2	m_sresb1

2.4 Data sorting by Autonomous Regions

Programming language: Unix

Objective: sort data from different observatories by “comunidades autónomas”.

Data: p for all observatories in Spain, different scenarios, models and time ranges and the correspondance between observatorie code and Comunidad Autónoma. The models and scenarios folder scheme is the same as the previous programm.



Future work

1. Obtain data of models from the 5th IPCC Report in order to obtain new regionalized climate change scenarios.
2. Integrate the statistical regionalization programs developed so far in a unique application for the obtention of regionalized climate change scenarios.
3. Explore new algorithms for statistical regionalization.